

FREQUENCY MEASURING DEVICE, POLISHING DEVICE  
USING THE SAME AND EDDY CURRENT SENSOR

ABSTRACT OF THE DISCLOSURE

Disclosed is a frequency measuring device capable of  
5 accurately detecting an end point of polishing a  
semiconductor wafer by obtaining a frequency measurement  
result highly accurately in a short period of time. A  
device FC for measuring the frequency of a measured signal.  
Vin comprises a counting section including a number  $i$  ( $i \geq 2$ )  
10 of  $n$ -nary counters  $1 - i$ , a time reference circuit 13 which  
outputs a time reference signal  $T$ , whose duration is  $t$ ,  
every time interval  $p$ , and a number  $I$  of gate circuits  $G1$   
to  $Gi$  whose outputs are connected to the inputs of the  
 $n$ -nary counters  $1 - i$ . The gate circuits receive the  
15 measured signal  $Vin$  at a first input and receive the time  
reference signal  $T$  at time intervals  $p$  at a second input.  
With this structure, the counting section supplies the  
frequency measured result of the measured signal  $Vin$  every  
time interval  $p$ .

20 Further, the present invention provides an eddy  
current sensor capable of stable operation is provided for  
accurately detecting a polishing end point. The eddy  
current sensor detects the thickness of a conductive film  
from a change in an eddy current loss generated in the  
25 conductive film. The eddy current sensor comprises a  
sensor coil for generating an eddy current in the  
conductive film, and an active element unit connected to  
the sensor coil for oscillating a variable frequency  
corresponding to the eddy current loss. The sensor coil  
30 and active element unit are integrated to form the eddy  
current sensor. Alternatively, the eddy current sensor  
comprises a sensor coil for generating an eddy current in  
the conductive film, and a detector for detecting a change  
in the thickness of the conductive film from a change in a  
35 resistance component ( $R$ ) in an impedance formed by the  
sensor coil and conductive film.

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